



7.5 Noxious Weed Control Program

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The noxious weed control program on the Hanford Site was developed in response to federal, state, and local laws requiring eradication or control of noxious weeds. Developed in an effort to satisfy agreements made in the federal interagency memorandum of understanding (1994), the noxious weed control program has been designated as a model for other DOE sites.

The four counties surrounding the Hanford Site (Adams, Benton, Franklin, and Grant Counties) have active noxious weed control programs to protect their important agricultural industries, native ecology, and other interests. The Hanford Site is viewed with great interest and concern as a potential source for invasion of noxious weeds into these counties.

7.5.1 Background

A noxious weed is defined as any plant that, when established, is highly destructive, competitive, or difficult to control by cultural or chemical practices. Typically, noxious weeds are non-native (alien) species that invade and displace native species, reduce habitat for fish and wildlife, and contribute to the extinction of sensitive species.

Priorities for control of noxious weeds on the Hanford Site are based primarily on 1) the potential for a weed species to spread and cause ecological damage, 2) the potential for a weed species to spread into radiological control areas and serve as a biological vector of contamination (take up stabilized radioactive elements and bring them to the surface), 3) the potential for a weed species to cause financial

harm to neighboring landowners, and 4) the control effort activities of neighboring counties.

Planning and field control for the noxious weed control program at Hanford is closely coordinated with the Washington State Department of Agriculture and Adams, Benton, Franklin, and Grant Counties. Weed control plans and progress of ongoing field control activities are reviewed in quarterly meetings. Other agencies and groups attending the quarterly meetings and assisting in the technical review of the program include Washington State University Agricultural Extension Service, U.S. Fish and Wildlife Service, Washington Department of Fish and Wildlife, U.S. Bureau of Reclamation, and South Columbia Irrigation District.

7.5.2 1998 Noxious Weed Control Activities

Nine plant species are on a high-priority list for control at the Hanford Site. These species are listed below, with a summary of the 1998 control activities.

Yellow starthistle (*Centaurea solstitialis*) represents the most rapidly expanding weed infestation in the western United States. Hanford is at a critical point in the infestation cycle. Over 800 ha

(2,000 acres) of the site have been heavily infested, and a large seed bank has been established in the soil. Many additional acres have scattered starthistle infestation. In the absence of control, starthistle will take over additional acres in the next few years, multiplying the size of the current infestation. Pioneer populations have begun in areas widely scattered from the



main infestation. Pioneer populations expand rapidly in size and serve as seed source for even wider distribution.

Efforts to control yellow starthistle were concentrated in three major areas in 1998: spot treatment of pioneer populations; control and maintenance on roadways; and aerial application of herbicide to a portion of the main infestation, including both the core population and the invasion zone. Approximately 320 ha (800 acres) were aerially treated. This constituted approximately one-third of the area of major infestation. An application is planned for the spring of 1999 to cover the remaining portion of the major infestation. It is expected that, with the aerial applications and a vigorous, timely control campaign in 1999, flowering and seed set for yellow starthistle will be dramatically reduced. Biological control organisms have been released in the major population of yellow starthistle over the past 3 yr. As chemical controls reduce the number and size of populations, it is hoped that biocontrols will assist in reducing seed production in scattered plants and isolated populations.

Rush skeletonweed (*Chondrilla juncea*) is widely scattered across the Hanford Site. Included are four populations of one or more acres where skeletonweed is either the dominant or codominant species. The remainder of the site has plants or small patches scattered many to hundreds of meters (feet) apart. Each of the four large populations of skeletonweed were treated with herbicide in 1998. Additionally, approximately one-fourth of the area known to harbor scattered skeletonweed was surveyed, and the plants were treated with herbicide as they were located.

Rush skeletonweed has a deep, extensive root system and minimal leaf area. These characteristics make it very difficult to control. Although initial chemical control of individual plants have appeared very effective, sprouts from deep roots that were not killed by the herbicide occasionally appear at the surface within 2 to 3 yr. Treated skeletonweed

populations are monitored for several years to identify and re-treat sprouts before the plants fully recover from previous control efforts. Biological controls for rush skeletonweed have been introduced at Hanford. Effectiveness of controls vary widely from population to population and from year to year. In 1998, as in most other years, some populations were highly affected by the biocontrols and flowering was eliminated. Other populations were less affected and some were not significantly impacted by the biocontrol agents. On the site, biocontrol agents available for rush skeletonweed rarely, if ever, prove lethal to plants. Nevertheless, under good conditions, individual populations can be prevented from flowering and setting seed during a year.

A number of babysbreath (*Gypsophila paniculata*) control methods were tested, including several chemical combinations; in 1996 and 1997, none proved effective. A new treatment tried in 1998 was very successful in killing the aerial portions of the plant. After positive results in trial plots, this treatment was implemented on approximately 80% of the Hanford population before the plants matured to the point that controls were no longer effective. Flowering and seed set were prevented in virtually 100% of the plants treated. However, mortality of the perennial root was only 10% to 20%. Although the treatments killed only the aerial portions of the plant, by destroying the leaves and stems, photosynthesis was curtailed, preventing plants from storing energy reserves for winter and spring 1999 sprouting.

Plants not killed by the 1998 treatments have been weakened. With consistent, follow-up treatment, it is expected that the plants will ultimately be weakened to the point of death. The babysbreath invasion is relatively small, and control by attrition is a practical alternative.

Three small populations of dalmation toadflax (*Linaria genistifolia* ssp. *Dalmatica*) have been found on the Hanford Site. All sites were treated in 1998 and will be monitored and treated in the future if resprouting occurs.



Five populations of spotted knapweed (*Centaurea maculosa*) are identified on the Hanford Site. All known individuals were treated in 1998. Follow-up monitoring has identified resprouting from seeds and roots that were not completely killed by initial herbicide treatments. Populations were inconsistent in response to treatment. Treatment of some populations appeared to be 100% successful, while other populations, given the same treatment, showed considerable resprouting. Spotted knapweed is a prolific seed producer and seeds remain viable in the soil for 10 yr or more. All populations will be monitored in subsequent years to check for resprouting and follow-up control.

Diffuse knapweed (*Centaurea diffusa*) has become established in several locations on the Hanford Site and is rapidly invading and expanding in many areas. Invasion of this weed threatens much of the site. 1998 was the first year that an aggressive attempt at control of diffuse knapweed had been made; approximately 20% of the population was treated. Control efforts are expected to increase in 1999. Major populations of diffuse knapweed were sprayed with herbicide to reduce overall seed production. A special effort was made to treat roadways to prevent seed production. Vehicle traffic is a major vector for dispersal of diffuse knapweed. Isolated populations can serve as seed sources to infest large areas and were spot sprayed. By controlling these pioneer populations, relatively large areas can be kept free of knapweed. Diffuse knapweed is a prolific seed producer and seeds remain viable in the soil for 10 yr or more. All populations will be monitored in subsequent

years to check for resprouting and to coordinate additional control measures.

Treatment of Russian knapweed (*Acroptilon repens*) was delayed until 1999 to focus attention on the more-invasive species.

Several individual plants of saltcedar (*Tamarix spp.*) are found on the Hanford Site, south and west of the Columbia River. Most remain from ornamental plantings around homes in the early part of this century. These plants are being controlled to prevent seed dispersal to sensitive habitats where uncontrolled populations may establish. A few populations are the result of natural seed dispersal; all plants were treated in 1998.

Saltcedar has an extensive root system that is very difficult to eliminate. Most plants on the Hanford Site have been treated for 3 yr; however, some continue to sprout new growth. Monitoring and annual treatment will continue until saltcedar is eradicated.

Actively reproducing populations of saltcedar have also established on DOE-owned land north and east of the Columbia River. These lands are leased and managed by the U.S. Fish and Wildlife Service and the Washington State Department of Fish and Wildlife. An active program is in place by these agencies, and the associated counties, to control saltcedar on these lands.

Portions of Hanford's riparian areas were monitored for purple loosestrife (*Lythrum salicaria*) in 1998. A single plant was identified and destroyed.